

229. The method of Claim 228 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm<sup>2</sup> to about 40 picomoles/cm<sup>2</sup>.

230. The method of Claim 219 wherein each of the recognition oligonucleotides comprises a spacer portion and a recognition portion, the spacer portion having attached to it the moiety comprising a functional group which can bind to the nanoparticles.

231. The method of Claim 230 wherein the spacer portion comprises at least about 10 nucleotides.

232. The method of Claim 231 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

233. The method of Claim 230 wherein the bases of the nucleotides of the spacers are all adenines, all thymines, all cytosines, all uracils, or all guanines.

234. The method of Claim 230 wherein the diluent oligonucleotides contain about the same number of nucleotides as are contained in the spacer portions of the recognition oligonucleotides.

235. The method of Claim 234 wherein the sequence of the diluent oligonucleotides is the same as the sequence of the spacer portions of the recognition oligonucleotides.

236. The method of Claim 219 wherein the oligonucleotides comprise at least two types of recognition oligonucleotides.

237. Nanoparticle-oligonucleotide conjugates which are nanoparticles having oligonucleotides attached to them, the oligonucleotides being present on surface of the nanoparticles at a surface density sufficient so that the conjugates are stable, at least some of the oligonucleotides having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide..

238. The conjugates of Claim 237 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 10 picomoles/cm<sup>2</sup>

239. The nanoparticles of Claim 238 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 15 picomoles/cm<sup>2</sup>.

240. The nanoparticles of Claim 239 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm<sup>2</sup> to about 40 picomoles/cm<sup>2</sup>.

241. The nanoparticles of Claim 237 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

242. The nanoparticles of Claim 241 wherein the nanoparticles are gold nanoparticles.

243. Nanoparticles having oligonucleotides attached to them, the oligonucleotides comprising at least one type of recognition oligonucleotides, each of the recognition oligonucleotides comprising a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide.

244. The nanoparticles of Claim 243 wherein the spacer portion has a moiety covalently bound to it, the moiety comprising a functional group through which the spacer portion is bound to the nanoparticles.

245. The nanoparticles of Claim 243 wherein the spacer portion comprises at least about 10 nucleotides.

246. The nanoparticles of Claim 245 wherein the spacer portion comprises from about 10 to about 30 nucleotides.

247. The nanoparticles of Claim 243 wherein the bases of the nucleotides of the spacer portion are all adenines, all thymines, all cytosines, all uracils or all guanines.

248. The nanoparticles of Claim 243 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 10 picomoles/cm<sup>2</sup>.

249. The nanoparticles of Claim 248 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of at least 15 picomoles/cm<sup>2</sup>.

250. The nanoparticles of Claim 249 wherein the oligonucleotides are present on surface of the nanoparticles at a surface density of from about 15 picomoles/cm<sup>2</sup> to about 40 picomoles/cm<sup>2</sup>.

251. The nanoparticles of Claim 243 wherein the nanoparticles are metal nanoparticles or semiconductor nanoparticles.

252. The method of Claim 251 wherein the nanoparticles are gold nanoparticles.